

name

project

date

page 162

#'s 5-12, 17, 19, 20, 30

tasks

$$(19) x^2 y^2 = 9 \text{ @ } (-1, 3)$$

$$2xy^2 + x^2(2y) \frac{dy}{dx} = 0$$

$$2xy^2 + 2x^2y \frac{dy}{dx} = 0$$

$$2x^2y \frac{dy}{dx} = -2xy^2$$

$$\frac{dy}{dx} = \frac{-2xy^2}{2x^2y} = \frac{-y}{x}$$

$$\left. \frac{dy}{dx} \right|_{\substack{x=-1 \\ y=3}} \left(\frac{-y}{x} \right) = \frac{-3}{-1} = 3 = m$$

$$\text{Tangent } y - 3 = 3(x + 1)$$

$$y - 3 = 3x + 3$$

$$y = 3x + 6$$

Normal

$$y - 3 = -\frac{1}{3}(x + 1)$$

$$y - 3 = -\frac{1}{3}x - \frac{1}{3}$$

$$y = -\frac{1}{3}x + \frac{8}{3}$$

$$(20) y^2 - 2x - 4y - 1 = 0 \text{ @ } (-2, 1)$$

$$2y \frac{dy}{dx} - 2 - 4 \frac{dy}{dx} = 0$$

$$\frac{dy}{dx}(2y - 4) = 2$$

$$\frac{dy}{dx} = \frac{2}{2y - 4}$$

$$\left. \frac{dy}{dx} \right|_{\substack{x=-2 \\ y=1}} = \frac{2}{2(1) - 4} = \frac{2}{-2} = -1 = m$$

$$\text{a) } y - 1 = -1(x + 2)$$

$$y - 1 = -x - 2$$

$$y = -x - 1$$

$$\text{b) } y - 1 = 1(x + 2)$$

$$y - 1 = x + 2$$

$$y = x + 3$$

$$(30) y^2 + 2y = 2x + 1$$

$$2y \frac{dy}{dx} + 2 \frac{dy}{dx} = 2$$

$$\frac{dy}{dx}(2y + 2) = 2$$

$$\frac{dy}{dx} = \frac{2}{2y + 2}$$

$$\frac{d^2y}{dx^2} = \frac{(0)(2y + 2) - 2(2 \frac{dy}{dx})}{(2y + 2)^2}$$

$$\frac{d^2y}{dx^2} = \frac{-4 \frac{dy}{dx}}{(2y + 2)^2}$$

$$\frac{d^2y}{dx^2} = \frac{-4 \left(\frac{2}{2y + 2} \right)}{(2y + 2)^2}$$

$$\frac{d^2y}{dx^2} = \frac{-8}{(2y + 2)^3}$$